

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte PETER J. GEISS, HOWARD S. LANDIS,  
and SON VAN NGUYEN

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Appeal No. 1999-0875  
Application No. 08/467,353

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ON BRIEF

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Before URYNOWICZ, FLEMING, and LEVY, Administrative Patent Judges.

URYNOWICZ, Administrative Patent Judge.

Decision on Appeal

This appeal is from the final rejection of claims 12 and 13. Claims 1-11 have been cancelled. Claims 14-21 have been

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indicated as directed to allowable subject matter but have been objected to as depending from a rejected claim.

The invention pertains to a capacitor structure. Claims  
12

and 13 read as follows:

12. An integrated circuit device including a body of solid material, and

means for altering stresses in said body of solid material, said means for altering stresses including a film from which a volatile material deposited with said film has been at least partially removed, said film being bonded to a portion of at least one of a layer of material, a fill material and said body of solid material.

13. A device as recited in claim 12, further including  
a cavity in said body of solid material,

wherein said film is bonded to a portion of an interior surface of said cavity.

The references relied upon by the examiner are:

Nakata et al. (Nakata)	4,417,298	Nov. 22, 1983
Kubo et al. (Kubo)	4,432,935	Feb. 21, 1984

Claims 12 and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Nakata in view of Kubo.

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The respective positions of the examiner and the appellants with regard to the propriety of this rejection are set forth in the examiner's answer (Paper No. 14) and the appellants' brief and reply brief (Paper Nos. 13 and 15, respectively).

#### Appellants' Invention

To form a capacitor, a trench 23 is formed in a semiconductor layer 10 (Fig. 2). Layer 10 forms a plate of the capacitor and it may be common to a plurality of capacitors or other circuit elements in a single chip. Collar 41 is formed in the trench by an isotropic deposition of an oxide, nitride or other suitable dielectric layer (Fig. 4). The remainder of the trench is then filled with semiconductor material 51 to form an opposing capacitor plate (Fig. 5).

Additional fabrication steps involving heat treatment are performed on the structure. During heat treatment and other processing steps, differential volume expansion may occur between the collar 41 and semiconductor material 51 which

results in unwanted compressive stresses in layer 10 surrounding the collar 41. Such stresses result in elastic deformation or strain outward from the trench. To avoid such stresses, a volume reduction is achieved in collar 41 or in material 51, or both. Significant volume reduction is achieved by increasing the amount of hydrogen in the as-deposited films 41 and 51, and later driving off most if not all of the hydrogen (dehydrogenation) during heat treatment.

#### The Prior Art

In Figures 2a and 2b, Nakata discloses a chip type tantalum capacitor which has an insulation resin frame 21 with a tantalum capacitor element 1 enclosed in the frame. The structure includes metal foil terminals 31 and 32, and lead wires 5a and 5b.

Figs. 5 of Nakata illustrate a process of making the chip type capacitor. The capacitor element is placed in cavity 11 of resin housing 7.

Kubo discloses a method of producing a titanium-aluminum alloy porous body for a solid electrolytic capacitor in order

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to reduce dependence upon tantalum. A film of titanium hydride and aluminum is heat treated to produce dehydrogenation in the process of forming the porous body.

The Rejection under 35 U.S.C. § 103

The examiner's position is that "It would have been obvious to one of ordinary skill in the art to replace the solid capacitor element of Nakata with the element of Kubo to diminish the dependence on tantalum."

After consideration of the positions and arguments presented by both the examiner and the appellants, we have concluded that the rejection should not be sustained.

It is considered that means for altering stresses in a body of solid material is not taught by the combined teachings of the references. Kubo teaches making a porous body for a solid electrolytic capacitor. The process involves a dehydrogenation process, which results in a size reduction of the body produced. After Kubo's porous body is made, it is the examiner's position that it would have been obvious to insert it as a capacitor in cavity 11 (Fig. 5c) of Nakata and enclose it in the housing or body comprising resin pieces 7, 15. Although we agree with the examiner that it would have

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been obvious to combine the teachings of the prior art, the combination does not meet all the elements of the claims. Kubo's porous body cannot be a means for altering stresses in the body 7, 15 of Nakata because the dehydrogenation process which causes a size reduction of the porous body would

have occurred before it was placed in the cavity 11 of Nakata's body of solid material 7, 15.

REVERSED

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STANLEY M. URYNOWICZ JR.	)	
Administrative Patent Judge	)	
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MICHAEL R. FLEMING	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
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STUART S. LEVY	)	
Administrative Patent Judge	)	

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WHITHAM CURTIS WHITHAM & MCGINN  
RESTON INTERNATIONAL CENTER  
11800 SUNRISE VALLEY DRIVE SUITE 900  
RESTON VA, 22091